

應用孔內水文地質調查成果於山崩潛勢評估

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摘要 本研究主要係嘗試透過孔內水文地質調查成果，評估地表下岩層的地質材料特性、水力特性與集水區山崩災害之關連性。本研究根據經濟部中央地質調查所的計畫成果，彙整大甲溪流與濁水溪流域內 49 處場址的水文地質鑽探、孔內井測試驗、封塞水力試驗與地下水位觀測等資料，進行地表下 100 公尺的岩層水文地質單元劃分，以建構山區水文地質特性與架構。統計分析結果顯示，山區岩層的架構主要可分為岩屑層（或風化岩層）與裂隙岩層，其岩屑層（風化岩層）平均厚度約為 13.5 公尺，而透水性與蓄水性較佳的岩層，其岩層深度分布在地表下 0~20 公尺與 30~50 公尺兩個區段。蒐集大甲溪與濁水溪流域的崩塌案例，發現淺層或深層的崩塌深度與上述岩層透水性與蓄水性較佳的區段有高度相關。此關連性可能係台灣山區受造山運動與板塊作用的影響，陡峭的地形與地貌使得表層的岩屑層分布較薄，其下與岩盤交界處的不連續面之區段，因裂隙發達或受風化作用而破碎，而深層多為新鮮的岩盤為主，然而部分區段可能受應力擠壓，造成岩盤較為破碎，岩心裂隙亦發現有擦痕或剪裂泥等錯動的痕跡，故此區段的岩層可能受降雨入滲的影響，地下水位的抬升促使岩層的孔隙水壓增加，而誘發岩屑或岩體滑動等地質災害。因此，透過本調查技術之調查成果，可瞭解山區部落或坡地集水區之水文地質架構，進而評估山崩可能發生的型態、滑動深度與規模。

關鍵詞：孔內水文地質調查、水力特性、地質災害、山崩。

The Application of Borehole Hydrogeological Investigation for Assessing Landslide Potential

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ABSTRACT This paper integrates a variety of in-situ downhole investigation data, including driller's logs, well logging, packer testing and groundwater level monitoring, from 49 boreholes at the mid- and upstream of Dajia and Jhuoshuei river basins. In the study area, it is found that the average thickness of regolith layer, *i.e.* the cover of loose weathering material, is about 13.5m, and for the underlying bedrock the water-bearing formations are commonly observed at the depth of 20m and 30~50m below the surface. Interestingly, a high coincidence is found between the occurrence of water-bearing formations and the critical depths of landslide. A reasonable inference can be drawn that the shallow landslides are mainly topographic and weathering controls, while the deep landslides are mainly associated with tectonic activity and pore-water pressure increase. Consequently, by effectively taking all downhole investigation data into account and constructing the hydrogeologic framework, not only the type, but also the occurring depth of landslides can be predicted.

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